



TITLE:

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List of polypores collected from natural forests in Sarawak, Borneo Island between 1954 and 2003

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ABSTRACT We re-identified polypore samples collected at 159 sites in Sarawak from 1954 to 2003 that had been maintained at the fungarium of Research, Development and Innovation Division, Forest Department Sarawak, Kuching. We present a list of 115 fungal species and one fungal subspecies out of 476 specimens from Polyporales and six other orders; pictures of all species and subspecies are included.

KEY WORDS Auriculariales / Boletales / Borneo / fungal species diversity / fungarium / Gloecophyllales / Hymenochaetales / Polyporales / Russulales / Trechisporales

Introduction

Fungi are the second most diverse group of living organisms in the world (Hawksworth 2001). They play important roles as decomposers, plant mutualists and parasites in forest ecosystems. Polypores, a morphological group of fungi that includes species belonging to order such as Hymenochaetales and Polyporales, are among the most important wood decomposers in forest ecosystems. Moreover, fruiting bodies of polypores play an important role in maintaining the diversity of arthropod species by providing food and habitat resources (Yamashita et al. 2015).

Large and long-lasting fruiting bodies of polypores are helpful for assessing the species diversity of wood-decaying fungi in tropical Asia. In northern Borneo, we revealed that a few polypore species dominate the polypore community in a primary forest, although more than 100 polypore species were recorded from the primary forest of Lambir Hills National Park, Sarawak (Yamashita et al. 2009a, 2009b). Based on these data, we revealed that the species diversity of polypores in primary forests is high in a tropical region compared with that in temperate or boreal regions (Yamashita et al. 2015). However, the geographical variation in the diversity of polypore species remains unknown.

Specimens collected from various study sites and maintained in natural history museums or research institutes contain potentially important information for understanding the geographical variation in species diversity (Graham et al. 2004). However, such research using fungal specimens is limited (Lavoie 2013) and has not been reported from tropical regions.

In Sarawak, approximately 900 specimens of polypores and other aphyllporaceous fungi, including corticioid fungi, have been deposited in the fungarium of Research, Development and Innovation Division of the Forest Department Sarawak since the 1950s. In this study, we re-identified polypore specimens to provide a list of all the polypore species collected from 1950 to 2003 that were deposited in this fungarium.

Methods

Between 2015 and 2018, we evaluated 774 polypore fungal specimens that were kept in the fungarium. We re-identified all the fungal specimens to update their taxonomic position. Macroscopic and microscopic characteristics were used to morphologically identify species based on the keys and descriptions provided by Choeyklin et al. (2009), Corner (1983, 1984, 1987, 1989a, 1989b, 1991), Dai & Li (2012), Hattori (2000, 2001, 2003a, 2003b, 2005, 2008), Hattori & Sotome (2013), Hattori et al. (2014), Li et al. (2014), Ota et al. (2009), Ryvarden & Johansen (1980) and Sotome et al. (2009, 2013, 2014). Higher taxa primarily follow the classification of Justo et al. (2017) and Kirk et al. (2008). Species are alphabetically listed according to the genus and family. In this report, we provide the species names, identification numbers of the specimens and collection site. Moreover, we provided synonyms used by Ryvarden & Johansen (1980) and Núñez & Ryvarden (2000, 2001).

Results and Discussion

Among the 774 specimens collected from 159 study sites, 115 species and one subspecies out of 476 specimens from 125 study sites were identified to the species level. Three species belong to Auriculariales, one species belongs to Boletales, two species belong to Gloeophyllales, 25 species belong to Hymenochaetales, 80 species belong to Polyporales, two species belong to Russulales and one species belongs to Trechisporales. These specimens were collected from national parks in Sarawak or forests near Kuching. More than 15 samples were obtained from Bako National Park (30), Samunsam Wildlife Sanctuary (29), Gn Mulu National Park (23), Bkt Buri (21), Semengoh Arboretum (18), Niah National Park (17), Engkabang Plantation Semengoh (16) and Lambir Hills National Park (16).

Of the 298 specimens, 155 specimens could not be identified even to the genus level. We suggest that several polypores in Sarawak still remain undescribed. For example, we found unusual basidiocarps with a woody context, lamellae and a distinct stipe [Plate 24-120; cf. *Gloeophyllum*, PS.02289 (Sematan)] among the examined specimens. Molecular techniques may reveal the phylogenetic positions of such undetermined species. Although molecular techniques are useful, most of the samples seemed too old to obtain DNA in good

condition. Further studies are necessary to uncover the species diversity of polypores in Sarawak.

List

Order AURICULARIALES

Incertae sedis

Elmerina cladophora complex (Berk.) Bres., Hedwigia 53(1-2): 71 (1912) [1913]

PS 04959 (Niah NP) (Plate 1-1)

Elmerina substuppea complex (Berk. & Cooke) T. Hatt., Mycoscience 44(4): 272 (2003)

= *Protomerulius substuppeus* (Berk. & Cooke) Ryvarden, Syn. Fung. (Oslo) 5: 212 (1991)

PS.01521 (Niah FR) (Plate 1-2)

Protodaedalea foliacea (Pat.) Sotome & T. Hatt., in Sotome, Maekawa, Nakagiri & Lee, Mycol. Progr. 13(3): 994 (2014)

PS05211 (Ulu Balingian) (Plate 1-3)

Order BOLETALES

Incertae sedis

Serpula similis complex (Berk. & Broome) Ginns, Mycologia 63(2): 231 (1971)

PS 04899 (Lower Baram FR) (Plate 1-4)

Order GLOEOPHYLLALES

Gloeophyllaceae

Gloeophyllum imponens (Ces.) Teng, Chung-kuo Ti Chen-chun, [Fungi of China]: 760 (1963)

= *Hispidadaelea imponens* (Ces.) Dai & He, in He, Vlasák & Dai, Mycol. Progr. 13: 836 (2014)

PS05616 (Bako NP), PS 05492 (Batu Lawi NP), FP No. 00060 / PS No. 00702 (Bkt Buri), PS.01887 (Gn Besi, Lundu) (Plate 1-5), PS04857 (Gn Gading FR), FP No. 00060 / PS No. 00021, PS. No. 04829 (Gn Mulu NP)

Gloeophyllum striatum (Fr.) Murrill, Bull. Torrey bot. Club 32(7): 370 (1905)

= *Daedalea striata* Fr. Syst. Mycol. 1: 334 (1821)

PS 04991 (Gn Lesong, Sri Aman), FP No. 00740 / PS No. 01718 (Kawood Sawmill, Sibui) (Plate 2-6), FP No. 00740 / PS No. 01071 (Kuala Baram), FP No. 00740 / PS No. 01192 (Lbk. Engkala L/C, Btg Sadong, 1st Division), PS04851 (Niah FR), FP No. 00740 / PS No. 00982 (Sematan Mangrove), FP No. 00740 / PS No. 01183 (Sg

Kedar, Seribas)

Order HYMENOGASTRALES

Hymenogastreae

Coltricia kinabaluensis complex Corner ex Y.C. Dai & Hai J. Li, Mycoscience 53(5): 341 (2012)

FP No. 00581 / PS No. 00725 (Bkt Buri) (Plate 2-7)

Coltriciella deceptiva (Lloyd) Corner, Beih. Nova Hedwigia 101: 44 (1991)

PS.02099 (Lambir NP), PS. 00565 / FP. 00143 (Tanjong Rian, Sibuluan) (Plate 2-8)

Coltriciella dependens (Berk. & M.A. Curtis) Murrill, Bull. Torrey bot. Club 31(6): 348 (1904)

= *Polyporus dependens* Berk. & Curt. Ann. Mag. Nat.Hist. Ser. 2, Vol. 12: 431, 1853.

PS 05490 (Batu Lawi NP), PS 2432 (Bkt Pagon Periok, Limbang) (Plate 2-9), PS. 01761 (Gn Raya, Bau), PS.01357 / FP00143 (Samunsam WS), PS.00627 / FP.0143 (Sematan)

“Cyclomyces” setiporus (Berk.) Pat., Essai Tax. Hyménomyc. (Lons-le-Saunier): 98 (1900)

= *Polyporus setiporus* Berk. Land. J. Bot. 6: 505 (1847)

PS 2133 (Lambir NP) (Plate 2-10), PS 1034 (Semengoh Arboretum)

Fulvifomes fastuosus complex (Lév.) Bondartseva & S. Herrera, Mikol. Fitopatol. 26(1): 13 (1992)

= *Polyporus fastuosus* Lév. Ann. Sci. Nat. Ser. 3, Vol. 2: 190 (1844)

= *Phellinus fastuosus* (Lév.) S. Ahmad, Basidiomyc. W. Pakist.: 56 (1972)

FP No. 00030 / PS. No. 00011 (Gn Serapi) (Plate 3-11), PS 2079 (Lambir), FP No. 00236 / PS No. 00591 (Loba Kabang PF), PS 04960 (Niah NP), PS05005 (Sematan Mangrove)

Fuscoporia discipes (Berk.) Dai & Ghob.-Nejh., in Ghobad-Nejhad & Dai, Mycotaxon 101: 216 (2007)

= *Polyporus discipes* Berk. Hooker Lond. J. Bot. 6: 499 (1847)

= *Phellinus discipes* (Berk.) Ryvarden, Kew Bull. 31(1): 88 (1976)

PS.0050/FP.0074 (Bako NP), PS 2506 (Bkt Pagon Periok, Limbang) (Plate 3-12)

Fuscoporia gilva complex (Schwein.) T. Wagner & M. Fisch., Mycologia 94(6): 1013 (2002)

= *Boletus gilvus* Schw. Fungi Carol. Super. II: 70 (1822)

= *Phellinus gilvus* (Schwein.) Pat., Essai Tax. Hyménomyc. (Lons-le-Saunier): 82 (1900)

PS 2580 (Bkt Pagon Periok, Limbang), PS 986 (Loba Pulau PF) (Plate 3-13), PS.04486 (Sg Apat, Dalat), PS 05588 (Sg Kenalian, Lawas) (Plate 3-14), PS 05282 (Sg Riam, Rambungan)

Fuscoporia senex (Nees & Mont.) Ghob.-Nejh., in Ghobad-Nejhad & Dai, Mycotaxon 101: 208 (2007)

= *Polyporus senex* Nees & Mont. Ann. Sci. Nat. Ser. 2 vol 5: 70 (1836)

- = *Phellinus senex* (Nees & Mont.) Imazeki, Bull. Gov. Forest Exp. Stn Tokyo 57: 115 (1952)
 FP No. 00236 / PS No. 00101 (Engkabang Plantation Semengoh) (Plate 3-15), PS 2230 (Gn Jambusan, Bau)
- Hymenochaete cyclolamellata*** T. Wagner & M. Fisch., Mycol. Prog. 1: 101 (2002)
 = *Cyclomyces fuscus* complex Kunze ex Fr., Linnaea 5: 512 (1830)
 PS 2121 (Plate 4-16), PS 2141 (Lambir NP)
- Hymenochaete porioides*** T. Wagner & M. Fisch., Mycol. Progr. 1(1): 101 (2002)
 = *Polyporus tabacinus* Mont. Ann. Sci. Nat. Ser. 3, vol 3: 349 (1835)
 = *Cyclomyces tabacinus* (Mont.) Pat., Essai Tax. Hyménomyc. (Lons-le-Saunier): 98 (1900)
 = *Inonotus tabacinus* (Mont.) Cunn., Bull. N.Z. Dept. Sci. Industr. Res., Pl. Dis. Div. 78: 3 (1948)
 PS 1211, PS 938 (Bako NP), FP No. 00543 / PS No. 00660 (Bkt Buri), PS 1270 (Engkabang Plantation Semengoh), PS 900 (Klauh FR) (Plate 4-17), PS.02189 (Lambir NP), PS 04936 (Niah NP), FP No. 00543 / PS NO. 01356, PS 1363 (Samunsam WS)
- Inonotus clemensiae*** Murrill, Bull. Torrey bot. Club 35: 401 (1908)
 PS 945 (Bako NP) (Plate 4-18)
- Inonotus pachyphloeus*** (Pat.) Wagner & Fisch., Mycologia 94: 1009 (2002)
 = *Polyporus pachyphloeus* Pat., Jour. Bot. (Paris), 3(15): 257 (1889)
 = *Phellinus pachyphloeus* (Pat.) Pat., Essai Tax. Hyménomyc. (Lons-le-Saunier): 97 (1900)
 FP No. 00287 / PS No. 00195 (Lower Baram FR) (Plate 4-19)
- Inonotus patouillardii*** (Rick) complex Imazeki, Bull. Tokyo Sci. Mus. 6: 105 (1943)
 PS 1674 (Gn Santubong) (Plate 4-20)
- Phellinus glaucescens*** (Petch) Ryvarden, Norw. JI Bot. 19: 234 (1972)
 = *Poria glaucescens* Petch, Ann. Roy. Bot. Gard. Peradeniya 6: 139 (1916)
 FP No. 00444 / PS No. 00470 (Gn Mulu NP) (Plate 5-21)
- Phellinus lamaensis*** (Murrill) Pat., Bull. Mus. natn. Hist. nat., Paris 29: 336 (1923)
 = *Pyropolyporus lamaensis* Murr., Bull. Torrey Bot. Club 34 (9): 479 (1907)
 PS05487 (Batu Lawi NP), PS 2073 (Gn Bunut, Sira Pedawan) (Plate 5-22), FP No. 00016 / PS No. 00249 (Loba Kabang PF), PS 0889 (Sebuyau PF)
- Phellinus setulosus*** (Lloyd) Imazeki, Bull. Tokyo Sci. Mus. 6: 104 (1943)
 = *Fomes setulosus* Lloyd, Mycol. Writ. 4: 243 (1915)
 PS 1762 (Gn Raya, Bau) (Plate 5-23)
- Phylloporia chrysites*** (Berk.) Ryvarden [as 'chrysita'], Norw. JI Bot. 19: 235 (1972)
 = *Polyporus chrysites* Berk. Hooker J. Bot. 8: 233 (1856)
 PS 1582 (Bako NP) (Plate 5-24)
- Phylloporia pectinata*** complex (Klotzsch) Ryvarden, Syn. Fung. (Oslo) 5: 196 (1991)
 = *Polyporus pectinatus* Kl. Linnaea 8: 486 (1833)

= *Phellinus pectinatus* (Klotzsch) Quél., Enchir. fung. Paris: 173 (1886)
 PS 1418 (Bkt Kapur, Bau) (Plate 5-25), FP No. 00330 / PS No. 00247 (Gn Gading FR),
 PS 901 (Klauh FR), PS.02138 (Lambir NP), PS 05121 (Tg Datu NP)

Pyrrhoderma adamantinum (Berk.) Imazeki, Trans. Mycol. Soc. Japan 7: 5 (1966)
 = *Polyporus adamantinus* Berk. Hook. J. Bot. 6: 141 (1854)
 = *Phellinus adamantinus* (Berk.) Ryvarden, Norw. J. Bot. 19: 234 (1972)
 PS 2761 (Merurong plateau, Bintulu) (Plate 6-26)

Incertae sedis

Oxyporus mollissimus (Pat.) D.A. Reid, Microscopy 32: 456 (1975)
 = *Polyporus mollissimus* Pat. J. Bot. Paris 1: 340 (1897)
 = *Spongipellis stramineus* Pat. Bull. Soc. Mycol. Fr. 23: 52 (1917)
 = *Leucophellinus hobsonii* (Berk. ex Cooke) Ryvarden, Mycotaxon 31: 51 (1988)
 PS00299 (Gn Batu, Bau) (Plate 6-27)

Trichaptum biforme (Fr.) Ryvarden [as 'biformis'], Norw. J. Bot. 19(3-4): 237 (1972)
 = *Polyporus biformis* Fr. in Kl. Linnaea 8: 486 (1833)
 = *Polyporus pergamenus* Fr. Epicr. p. 480 (1838)
 PS 2433, PS 2581(Bkt Pagon Periok, Limbang) (Plate 6-28), PS 05459, PS 05463(Gn Murud, Lawas)

Trichaptum byssogenum (Jungh.) Ryvarden [as 'byssogenus'], Norw. J. Bot. 19(3-4): 237 (1972)
 = *Polyporus byssogenus* Jungh. Verh. Batav. Genootsch. 17: 43 (1838)
 = *Trametes versatilis* Berk. Hook. Lond. J. Bot. 1: 150 (1842)
 PS 05138 (Pulau Nak Dendang, Sematan), PS 1177 (Pusa Sawmill, 2nd Div), PS 05431 (Rajang Mangrove NP), PS. 02310 (Sematan), PS 05263 (Sg Asam, Rambungan) (Plate 6-29), PS 05316 (Sg Empayak, Saratok), PS04462 (Sg Sekait, Sri Aman), PS 05139 (Tg Datu NP), PS.00627 / FP.0143 (Sematan)

Trichaptum durum (Jungh.) Corner, Beih. Nova Hedwigia 86: 219 (1987)
 = *Polyporus durus* Jungh. Verh. Batav. Genootsch. 17: 62 (1838)
 = *Nigroporus durus* (Jungh.) Murr. Bull. Torrey Bot. Cl. 34: 471 (1907)
 PS 2503 (Bkt Pagon Periok, Limbang) (Plate 6-30), PS 2120 (Lambir NP)

Trichaptum lacunosum Corner, Beih. Nova Hedwigia 86: 225 (1987)
 FP No. 00578 / PS No. 00750 (Bkt Buri), PS.01419 / FP.00143 (Bkt Kapur, Bau), PS04838 (Gn Serapi), PS03150 / FP00143 (Samunsam WS) (Plate 7-31), PS.01064 / FP.00143 (Sematan), FP No. 00143 / PS No. 00547 (Telok Belian, Santubong)

Trichaptum sprucei (Berk.) Rajchenb. & Bianchin., Mycol. Res. 96(11): 957 (1992)
 FP No. 00139 / PS No. 00944, FP No. 00139 / PS No. 01023, PS05599 (Bako NP), PS04837, PS04839 (Gn Serapi), FP No. 00139 / PS No. 00355 (Gn Tai Ton, Bau) (Plate 7-32), PS 05420 (Ulu Sg Kura, Simunjan)

Order POLYPORALES

Cerrenaceae

- Cerrena zonata*** complex (Berk.) H.S. Yuan, Mycol. Progr. 13(2): 363 (2013) [2014]
 = *Irpex zonatus* Berk., Hooker's J. Bot. Kew Gard. Misc. 6: 168 (1854)
 = *Antrodiella zonata* (Berk.) Ryvarden, Boln Soc. argent. Bot. 28(1-4): 228 (1992)
 PS 2504 (Bkt Pagon Periok, Limbang) (Plate 7-33)

Fomitopsidaceae

- Daedalea aurora*** complex (Ces.) Aoshima, Trans. Mycol. Soc. Japan 8(1): 2 (1967)
 PS.00657 (Bkt Buri), PS.0845 / FP. 0050, PS05013 (Gn Mulu NP), PS 04904 (Lower Baram FR), PS 2762 (Merurong plateau, Bintulu), PS 05575 (Sabal FR), PS 1294 (Samunsam WS) (Plate 7-34), FP No. 00050 / PS No. 00847, PS 04975 (Sg Tekalong, Lintgga)
- Daedalea dochmia*** (Berk. & Broome) T. Hatt., Mycoscience 46(5): 307 (2005)
 = *Polyporus dochmius* Berk. & Br. Linn. Soc. Bot. J. 14: 50 (1857)
 = *Fomitopsis dochmius* (Berk. & Br.) Ryv. Norw. J. Bot. 19: 231 (1972)
 PS 947 (Bako NP), PS. 02760 (Bkt Skalap, Bintulu), PS 04993 (Gn Lesong, Sri Aman),
 FP No. 00040 / PS No. 00505 (Gn Mulu NP), PS 1763 (Gn Raya, Bau) (Plate 7-35),
 FP No. 00040 / PS No. 00140, PS.0080 / FP.0141 (Gn Serapi), PS 1032, PS 877, PS 880 (Semengoh Arboretum)
- Daedalea lusor*** (Corner) T. Hatt., Mycoscience 46(5): 311 (2005)
 PS.00701, PS.00730 (Bkt Buri), PS 868 (Loba Kabang PF), PS 1364 (Samunsam WS) (Plate 8-36)
- Daedalea pseudodochmia*** (Corner) T. Hatt., Mycoscience 46(5): 308 (2005)
 PS.0663/FP.0558 (Bkt Buri) (Plate 8-37), PS 05338 (Sg Sendok, Matang)
- Fomitopsis ostreiformis*** complex (Berk.) T. Hatt., Mycoscience 44(4): 272 (2003)
 PS 1736 (Gn Raya, Bau), PS 05124 (Sg Angus, Sematan) (Plate 8-38), PS 05265 (Sg Asam, Rambungan) PS 05262 (Sg Asam, Rambungan)
- Fomitopsis pseudopetchii*** (Lloyd) Ryvarden, Norw. J. Bot. 19: 231 (1972)
 = *Fomes pseudopetchii* Lloyd. Lloyd Mycol. Writ. 7: 1202 (1923)
 PS.0057 / FP.0141 (Semengoh Arboretum) (Plate 8-39)
- Fomitopsis rubida*** (Berk.) A. Roy & A.B. De [as 'rubidus'], Mycotaxon 60: 317 (1996)
 PS.00655 (Bkt Buri) (Plate 8-40), PS.0235 / FP. 0138 (Gn Gading FR)

Incrustoporiaceae

- Tyromyces armeniacus*** (Corner) T. Hatt., Mycoscience 44(6): 456 (2003)
 PS 1298 (Plate 9-41), PS 3151 (Samunsam WS)

Irpicaceae

- Flavodon cervinogilvus*** (Jungh.) Corner, Beih. Nova Hedwigia 86: 58 (1987)
 = *Oxychaete cervinogilva* (Jungh.) Miettinen, in Miettinen, Spirin, Vlasák, Rivoire, Stenroos & Hibbett, MycoKeys 17:20 (2016)

PS 1210 (Plate 9-42), PS 943 (Bako NP), PS 04891 (Gn Mentawa, Pedawan), PS 1522 (Niah FR), PS 1184 (Sematan Mangrove)

Flavodon flavus (Klotzsch) Ryvarden, Norw. JI Bot. 20(1): 3 (1973)

= *Irpex flavus* Klotzsch, Linnaea 8: 488 (1833)

= *Irpex flavus* Jungh., Verhand. Batav. Genootsch. 17: 46 (1839)

PS 04906 (Lower Baram FR) (Plate 9-43)

Laetiporaceae

Laetiporus discolor (Klotzsch) Corner, Beih. Nova Hedwigia 78: 183 (1984)

PS.0142 / FP.0716 (Gn Serapi), PS. 03131 / FP0716, PS. 03138, PS. 03157 (Samunsam WS) (Plate 9-44)

Laetiporus sulphureus complex (Bull.) Murrill, Annls mycol. 18(1/3): 51 (1920)

= *Polyporus sulphureus* Fr. Syst. Mycol. 1: 357 (1821)

PS4132 (Gn Mulu NP) (Plate 9-45), PS.04482 (Sg Apat Camp B, Balingian)

Meripilaceae

Meripilus applanatus Corner, Beih. Nova Hedwigia 78: 197 (1984)

PS.04301 (Belaga), PS. 04113, PS. 04115 (Gn Mulu NP) (Plate 10-46), PS 05571 (Sg Urak Linau, Belaga)

Rigidoporus defibulatus (D.A. Reid) Corner, Beih. Nova Hedwigia 86: 159 (1987)

= *Microporellus defibulatus* D.A. Reid, Microscopy 32: 452 (1975)

PS 05089 (Tg Datu NP) (Plate 10-47)

Rigidoporus lineatus (Pers.) Ryvarden, Norw. JI Bot. 19: 236 (1972)

= *Polyporus lineatus* Pers. in Gaudichaud, Voyage aut. de Monde p.174 (1827)

PS 2582 (Bkt Pagon Perioik, Limbang) (Plate 10-48)

Rigidoporus microporus (Sw.) Overeem, Icon. Fung. Malay. 5: 1 (1924)

= *Polyporus microporus* Fr. Syst. Mycol. 1: 376 (1821)

= *Polyporus lignosus* Kl, Linnaea 8: 485 (1833)

PS 04884 (Bako NP), FP No.00122 / PS No. 00733 (Bkt Buri), PS.0609 / FP. 0485 (Engkabang Plantation Semengoh), FP No.00122 / PS No. 00282, FP No.00122 / PS No. 00842 (Ensengei FR), PS 04992 (Gn Lesong, Sri Aman), PS 2002 (Gn Mentawa, Pedawan), PS. 02019 (Gn Sebeduk, Krian Pedawan), FP No. 00138 / PS No. 00081 (Gn Serapi), PS.4456 (Kok Hua Sawmill. Seratok.), PS 05495 (Lawas), PS 04902 (Lower Baram FR), PS 04935 (Niah NP), PS 1324, PS 1376 (Samunsam WS) (Plate 10-49), PS.0106/ FP.0122 (Semengoh Arboretum), PS04352 (Sg Iseng, Sebuyau), PS 05364 (Similajau NP), PS 05426 (Sg Tapang, Simunjan)

Podoscyphaceae

Abortiporus zonatus (Corner) T. Hatt., Mycoscience 72(1): 23 (1999)

PS 1525 (Niah FR) (Plate 10-50)

Polyporaceae

Abundisporus fuscopurpureus (Pers.) Ryvarden, Belg. JI Bot. 131(2): 154 (1999)
[1998]

= *Polyporus fuscopurpureus* Pers., Voy. aut. Monde, Bot. p.172 (1827)

PS 2277 (Gn Gading FR) (Plate 11-51c), PS 2322 (Ulu Sg Sepayan, Pagon) (Plate 11-51a, b)

Amauroderma atrum (Lloyd) Corner, Beih. Nova Hedwigia 75: 70 (1983)

PS.0654 / FP.0642 (Bkt Buri), PS 05413 (Sg Sabal Apeng, Simunjan) (Plate 11-52)

Amauroderma conjunctum (Lloyd) Torrend, Brotéria, sér. bot. 18(no. 2): 133 (1920)

= *Polyporus conjunctus* Lloyd Mycol. Writ. 5: 812 (1918)

= *Polyporus eylesii* Van. d. Byl. S. Afr. J. Sci. 24: 225 (1927)

PS05344, PS05350 (Sg Rayu, Matang) (Plate 11-53)

Amauroderma leptopus (Pers.) J.S. Furtado, Bull. Jard. Bot. natn. Belg. 37: 310 (1967)

PS.1212/FP.0033 (Plate 11-54), PS05038 (Bako NP), PS.1133/FP.0033 (Niah NP)

Amauroderma parasiticum Corner, Beih. Nova Hedwigia 75: 79 (1983)

PS 1722 (Semengoh Arboretum) (Plate 11-55)

Amauroderma subrugosum (Bres. & Pat.) Torrend, Brotéria, sér. bot. 18(no. 2): 128 (1920)

PS. 00969, PS.01237 (Bako NP), PS.00034 (Engkabang Plantation Semengoh), PS.01777 (Gn Besi, Lundu), PS. 0232/FP.0119, PS.0246/FP.0088 (Gn Gading FR), PS.01519 (Niah FR), PS05151 (Niah NP), PS05026, PS05027 (Nyabau, Bintulu), PS.0855/FP.0088 (Sawai PF), PS.0053/FP.0088, PS.0129/FP.0660 (Plate 12-56), PS.0666/FP.0660 (Semengoh Arboretum), PS05348 (Sg Rayu, Matang), PS 05108 (Tg Datu NP)

Coriopsis albobadia (Lloyd) T. Hatt. & Sotome, Mycoscience 54(4): 305 (2013)

= *Polystictus albobadius* Lloyd, Mycol. Writ. 6 (Letter 65): 1038 (1920)

= *Trametes retropicta* Lloyd, Mycol Writ. 7 (Letter 66): 1113 (1922)

= *Coriopsis retropicta* (Lloyd) Teng, Chung-kuo Ti Chen-chun: 760 (1963)

FP No. 00333 / PS No. 00315 (Gn Doya, Bau), PS. 01464 (Gn Tai Ton, Bau) (Plate 12-57), PS04922 (Lambir NP), FP No. 00333 / PS No. 00522 (Santubong)

Coriopsis aspera complex (Jungh.) Teng, Chung-kuo Ti Chen-chun, [Fungi of China]: 759 (1963)

= *Polyporus asper* Jungh. Verh. Batavisch. Genootsch. 17: 60 (1838)

PS.0045/FP.0017 (Bako NP) (Plate 12-58), PS. 0007/FP0017 (Bkt Braang, Pedawan), FP No. 00017 / PS No. 00846 (Lambir NP)

Coriopsis badia (Berk.) Murrill, Bull. Torrey bot. Club 34: 466 (1907)

PS 05264 (Sg Asam, Rambungan), PS 05314 (Sg Empayak, Saratok) (Plate 12-59), PS.04478 (Mukah), PS 2280 (Road to Biawak, 1st Div), PS 1345, PS 1354, PS 1377 (Samunsam WS)

Coriopsis caperata complex (Berk.) Murrill, N. Amer. Fl. (New York) 9(2): 77 (1908)

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PS.00675 (Bkt Buri), PS 04950 (Niah NP), PS 05299 (Sg Stoh, Rambungan) (Plate 12-60)

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= *Polystictus glabrorigens* Lloyd, Mycol. Writ. 7: 1145 (1922)

PS 04985 (Gn Lesong, Sri Aman) (Plate 13-61)

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= *Trichaptum lacunosum* Corner, Beih. Nova Hedwigia 86: 225 (1987)

PS 04988 (Sg. Jongkong Sawmill, Sri Aman) (Plate 13-62)

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PS 1461 (Gn Tai Ton, Bau) (Plate 13-63)

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PS. 03405 (Gn Mulu NP) (Plate 13-64)

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PS. No. 4783 (Sg Angkong Camp, Lingga) (Plate 14-68)

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= *Daedalea brasiliensis* Fr. Syst. Myc. 1: 332 (1821)

PS.4457 (Sg Sekait, Sri Aman) (Plate 14-69)

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= *Polyporus grammacephalus* Berk., London J. Bot. 1(3): 148 (1842)

PS 1889 (Gn Gading FR), FP No. 00242 / PS No. 00341 (Gn Jebong, Bau) (Plate 14-70),

PS. 01481 (Gn Sirenggok, Bau), FP No. 00144 / PS No. 00086 (Herbarium Nursery, Kuching, 1st Div.), PS 04918 (Lambir NP), PS. 02056 (Mulambak, Sira Pedawan), PS 2320 (Ulu Sg Sepayan, Pagon)

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FP No. 00065 / PS No. 00023 (Bkt Nyabau, Bintulu), FP No. 00065 / PS No. 00024 (Gn Mulu NP), PS. No. 4517 (Saratok) (Plate 15-72)

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PS 04910 (Kuala Baram) (Plate 15-74)

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= *Polyporus lucidum* Fr. Syst. Mycol. 1: 353 (1821)

PS.01774 (Bkt Undan, Bau) (Plate 15-75)

Ganoderma ochrolaccatum (Mont.) Pat., Bull. Soc. mycol. Fr. 5(2,3): 68 (1889)

PS 906 (Rajang Mangrove FR), PS05429, PS05435 (Rajang Mangrove NP), PS 04881 (Sematan), PS05279 (Sg Bandang, Rambungan), PS04858, PS05586 (Sg Kenalian, Lawas) (Plate 16-76)

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= *Boletus tenuis* Hook. in Kunth, Syn. Pl. 1: 10 (1822)

PS.01581, PS05603 (Bako NP), FP No. 00028 / PS No. 00254 (Gn Gading FR), FP No.

00028 / PS No. 00010 (Gn Mentawa, Pedawan), FP No. 00028 / PS No. 00234 (Lundu), PS 05432 (Rajang Mangrove NP), PS.0558 (Santubong), PS. 00622 / FP.00457, PS05004 (Sematan Mangrove), PS 05127 (Sg Angus, Sematan), PS 05278 (Sg Bandang, Rambungan) (Plate 16-77)

Lenzites acutus Berk., London J. Bot. 1(3): 146 (1842)

PS.0946 (Bako NP), PS. 00721 (Bkt Buri), PS04840 (Engkabang Plantation Semengoh), PS. 02071 (Gn Api, Kuching), PS. 01886, PS.01888 (Gn Besi, Lundu), FP No. 00736 / PS No. 01717 (Kawood Sawmill, Sibul), PS04983 (Klauh FR), PS. 02085 (Lambir), PS.01113 (Lambir NP or Niah NP), PS.01518, PS.01520 (Niah FR), PS 2314 (Sabal FR), PS. 03139, PS.01355 (Samunsam WS), PS. 04350 (Sg Buloh Ayan, Sebuyau) (Plate 16-78), PS. 01201 (Sg Jalik, Sibul), PS 05145 (Sg Puguh, Sematan), FP No. 00736 / PS No. 01154 (Sg Tisak, Btg Lupa), PS.03554 (Similajau NP)

Lenzites elegans (Spreng.) Pat., Essai Tax. Hyménomyc. (Lons-le-Saunier): 89 (1900)

= *Daedalea elegans* Fr. Syst. mycol. 1: 335 (1821)

= *Trametes elegans* (Spreng.) Fr., Epicr. syst. mycol. (Upsaliae): 492 (1838)

PS. 03356 (Bakam, Miri), FP No. 00077 / PS No. 00067, PS. 01274 (Engkabang Plantation Semengoh), PS. 01885 (Gn Besi, Lundu), PS.01810 (Gn Gading FR), PS 00028 (Gn Mulu NP), FP No. 00077 / PS. No. 01466 (Gn Tai Ton, Bau), PS 05286 (Loba Rambungan), PS.01502 (Oya Road, Sibul), PS 05430 (Rajang Mangrove NP), PS05130 (Sg Angus, Sematan), FP No. 00077 / PS. No. 00851 (Sebuyau PF), FP No. 00077 / PS No. 00061 (Semengoh Arboretum), PS05294 (Sg Lintah, Rambungan), PS05300 (Sg Stoh, Rambungan), PS No. 03556 (Similajau NP) (Plate 16-79)

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= *Polyporus vespaceus* Pers. in Gaudichaud, Voy. au. Monde p.170 (1827)

PS04830 (Gn Mulu NP) (Plate 16-80)

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= *Polyporus rhinocerus* Cooke, Trans. Bot. Soc. Edinburgh 13: 150 (1879)

PS.0726 / FP. 0564 (Bkt Baju, Pedawan) (Plate 17-81), PS. 0738 / FP. 0564, PS.1014 / FP. 0564 (Bkt Buri), PS.01983 (Gn Mentawa, Pedawan)

Microporellus fuliginosus Corner, Beih. Nova Hedwigia 86: 109 (1987)

PS 04896 (Semengoh Arboretum) (Plate 17-82)

Microporellus grandiporus complex Corner, Beih. Nova Hedwigia 86: 110 (1987)

PS.02199, PS04912 (Lambir NP) (Plate 17-83), PS.03235 (Niah NP), PS. 02301 (Sematan Mangrove)

Microporellus inusitatus complex (Lloyd) Corner, Beih. Nova Hedwigia 86: 12 (1987)

FP. 00561 / PS. 00851 (Bkt Buri) (Plate 17-84), PS. 0508 / FP. 0483 (Gn Mulu NP), FP No. 00561 / PS No. 00850 (Sawai PF), PS 1063 (Semengoh Arboretum)

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= *Microporellus inusitatus* (Lloyd) Corner, Beih. Nova Hedwigia 86: 12 (1987)

PS.04203 (Usun Apau) (Plate 17-85)

- Microporus affinis*** (Blume & T. Nees) Kuntze, Revis. gen. pl. (Leipzig) 3: 494 (1898)
 = *Polyporus affinis* Blume & T. Nees, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 13: 18 (1826)
 PS 2507 (Bkt Pagon Periok, Limbang), FP No., 00066 / PS No. 00161, PS 04878 (Engkabang Plantation Semengoh), PS 05466 (Gn Murud, Lawas), PS 896 (Plate 18-86), PS04994 (Sebuyau PF), PS 875 (Semengoh Arboretum), FP. No. 00066 / PS No. 01276 (Semengoh FR)
- Microporus affinis-microloma*** (Lloyd) T. Hatt. & Sotome, Mycoscience 54(4): 302 (2013)
 PS04927 (Niah NP) (Plate 18-87)
- Microporus carneoniger*** (Berk. ex Cooke) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 495 (1898)
 FP No. 00048 / PS No. 00454 (Plate 18-88), FP No. 00048 / PS No. 00506, FP No. 00048/ PS No. 00016 (Gn Mulu NP), PS05349 (Matang WC), PS.No.003234 (Niah NP), FP No. 00048/ PS No. 01323 (Samunsam WS), PS 2290 (Sematan Mangrove)
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 PS 04432 (Gedong) (Plate 18-89c), PS 1462 (Gn Batu, Bau) (Plate 18-89a, b), PS 1299 (Samunsam WS)
- Microporus xanthopus*** (Fr.) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 494 (1898)
 = *Polyporus xanthopus* Fr. Syst. mycol. 1: 350 (1821)
 PS.00046 (Bako NP), FP. No. 00003 / PS No. 00003 (Bkt Regu, Pedawan) (Plate 18-90), PS. 01393 (Gn Batu, Bau), PS05042 (Semengoh FR)
- Navisporus floccosus*** complex (Bres.) Ryvarden [as 'floccosa'], in Ryvarden & Johansen, Prelim. Polyp. Fl. E. Afr. (Oslo): 443 (1980)
 = *Trametes floccosa* Bres. Ann. Roy. Inst. Bot. Roma 6: 179 (1896)
 PS. 0919 (Sematan) (Plate 19-91), PS 05288 (Loba Rambungan), PS. 0630 / FP. 0649, PS. 0633 / FP. 0649 (Sematan)
- Neofomitella rhodophaea*** complex (Lév.) Dai, Hai & Vlasák, in Li, Li, Vlasák & Dai, Mycotaxon 129: 15 (2015)
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 PS. 0737 / FP. 0563 (Bkt Buri) (Plate 19-92), PS. 0646 / FP. 0490 (Sematan) (Plate 19-93)
- Perenniporia decurrata*** Corner, Beih. Nova Hedwigia 96: 105 (1989)
 PS 2190 (Lambir NP) (Plate 19-94), PS.0853/FP.0583 (Sawai PF), FP No. 00544 / PS No. 00861 (Sawai PF)
- Perenniporia ferruginea*** Corner [as 'Perenniporis'], Beih. Nova Hedwigia 96: 106 (1989)
 PS 04986 (Gn Lesong, Sri Aman) (Plate 19-95)
- Perenniporia latissima*** (Bres.) Ryvarden, Mycotaxon 33: 314 (1988)

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 PS.0752/ FP.0559, PS.751/FP.0559 (Bkt Buri), PS. 0055/FP.0435 (Semengoh Arboretum)
 (Plate 20-96)
- Perenniporia marmorata*** (Corner) T. Hatt., Mycoscience 41(4): 343 (2000)
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 PS 1775 (Bkt Undan, Bau), FP No.00625 / PS. No. 00529 (Gn Santubong), PS 2311 (Sg Bedaun, Sematan) (Plate 20-97)
- Polyporus arcularius*** complex (Batsch) Fr., Syst. mycol. (Lundae) 1: 342 (1821)
 = *Lentinus arcularius* (Batsch) Zmitr., IJMM 12: 88 (2010)
 PS05370 (Sakawi camp, Tatau, Bintulu Div.) (Plate 20-98)
- Polyporus dictyopus*** complex Mont., Annls Sci. Nat., Bot., sér.2 3: 349 (1835)
 PS. 01396 (Gn Batu, Bau) (Plate 20-99), PS.02348 (Bkt Pagon Periok, Limbang),
 PS.00883, PS04842 (Engkabang Plantation Semengoh), FP No. 00083/ PS No.
 00481, PS. 03414 (Gn Mulu NP), PS. 01766 (Gn Raya, Bau), PS. 02187 (Lambir
 NP) (Plate 20-100), FP No. 00083/ PS No. 00035 (Serian), PS 05345 (Sg Sendok,
 Matang), PS. 03548 (Similajau NP), PS 04961 (Tg Rian, Sibu)
- Polyporus philippinensis*** complex Berk., London J. Bot. 1(3): 148 (1842)
 PS.02763 (Bkt Skalap, Bintulu), PS 05352 (Matang WC), FP No. 00065 / PS No. 01326
 (Plate 21-101), FP No. 00065 / PS No. 03149 (Samunsam WS), PS.04263 (Belaga),
 FP No. 00065 / PS No. 00860 (Sawai PF)
- Pycnoporus puniceus*** (Fr.) Ryvarden, Norw. Jl Bot. 19: 236 (1972)
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 PS 2262 (Gn Gading FR), FP No. 00717 / PS NO. 01380 (Sabal FR) (Plate 21-102)
- Pycnoporus sanguineus*** (L.) Murrill, Bull. Torrey bot. Club 31(8): 421 (1904)
 = *Polyporus sanguineus* Fr, Syst, Mycol, 1: 371 (1821)
 FP No. 00019 / PS No. 00051 (Bako NP), PS 05473 (Batu Lawi NP), FP No. 00019 / PS
 No. 00009 (Bkt Regu, Pedawan), PS. 03524 (Gn Pueh, Sematan) (Plate 21-103),
 PS.02086 (Lambir), PS 05577 (Lubok Pulau Helang, Lawas), PS 1574, PS.01573
 (Niah FR), FP No. 00019 / PS No. 01505 (Oya Road, Sibu), PS 05578 (Pulau
 Pulauan, Lawas), FP No. 00091 / PS No. 01200 (Retus PF), PS 1296 (Samunsam
 WS), FP No. 00019 / PS No. 01179 (Sebuyau PF), FP No. 00019 / PS NO. 00647
 (Sematan), PS05125 (Sg Angus, Sematan), PS 05590 (Sg Kenalian, Lawas),
 PS05304 (Sg Stoh, Rambungan), FP No. 00019 / PS No. 01159 (Sg Tekalong,
 Lintgga), PS04341 (Sri Aman), PS 05022 (Subis, Niah)
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 Bot. 19: 236 (1972)
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- = *Polyporus lactineus* Berk. Ann. Nat. Hist. 10: 373 (1842)
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- PS 05129 (Sg Angus, Sematan) (Plate 22-106)
- Trametes menziesii*** (Berk.) Ryvarden [as 'menzeisii'], Norw. Jl Bot. 19(3-4): 236 (1972)
- = *Polyporus menziesii* Berk. Ann. Nat. Hist. 10: 378 (1843)
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- Trametes modesta*** complex (Kunze ex Fr.) Ryvarden, Norw. Jl Bot. 19: 236 (1972)
- = *Polyporus modestus* Fr. Linnaea 5: 519 (1830)
- PS 2383 (Bkt Pagon Periok, Limbang) (Plate 22-109)
- Vanderbylia latissima*** complex (Bres.) D.A. Reid, Jl S. Afr. Bot. 39(2): 167 (1973)
- PS. 0991 / FP.0732 (Timber Research Centre, Kuching) (Plate 22-110)

Steccherinaceae

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- Flabellophora licmophora*** (Masse) Corner, Beih. Nova Hedwigia 86: 32 (1987)
- PS 04978 (Sg Tekalong, Lintgga) (Plate 23-112)
- Flabellophora obovata*** (Jungh.) Corner, Beih. Nova Hedwigia 86: 36 (1987)
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Order RUSSULALES

Bondarzewiaceae

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 PS 1391 (Gn Batu, Bau) (Plate 24-117), PS.0163 / FP. 0121 (Semengoh Arboretum), PS 05215 (Ulu Balingian)

Order TRECHISPORALES

Hydnodontaceae

Cristelloporia pahangensis (Corner) T. Hatt., Mycoscience 44(6): 459 (2003)
 PS 1465 (Gn Tai Ton, Bau) (Plate 24-118)

Order INCERTAE SEDIS

Incertae sedis

Roseofavolus eos (Corner) T. Hatt., Mycoscience 44(6): 458 (2003)
 PS 03955 (Belaga), PS.04112 (Gn Mulu NP), PS04380 (Menggu Jela) (Plate 24-119), PS 05079 (Sampadi FR), PS.04484 (Sg Apat, Dalat)

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Explanation of plates

- Plate 1.** 1: *Elmerina cladophora* complex 2: *Elmerina substuppea* complex 3: *Protodaedalea foliacea* 4: *Serpula similis* complex 5: *Gloeophyllum imponens* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
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- Plate 3.** 11: *Fulvifomes fastuosus* complex 12: *Fuscoporia discipes* 13: *Fuscoporia gilva* complex 14: *Fuscoporia gilva* complex 15: *Fuscoporia senex* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
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- Plate 5.** 21: *Phellinus glaucescens* 22: *Phellinus lamaensis* 23: *Phellinus setulosus* 24: *Phylloporia chrysites* 25: *Phylloporia pectinata* complex **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
- Plate 6.** 26: *Pyrrhoderma adamantinum* 27: *Oxyporus mollissimus* 28: *Trichaptum bifforme* 29: *Trichaptum byssogenum* 30: *Trichaptum durum* complex **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
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- Plate 9.** 41: *Tyromyces armeniacus* 42: *Flavodon cervinogilvus* 43: *Flavodon flavus* 44: *Laetiporus discolor* 45: *Laetiporus sulphureus* complex **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
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- Plate 14.** 66: *Datroniella subtropica* 67: *Earliella scabrosa* 68: *Echinochaete russiceps* 69: *Favolus brasiliensis* complex 70: *Favolus emeric* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
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- Plate 16.** 76: *Ganoderma ochrolaccatum* 77: *Hexagonia tenuis* 78: *Lenzites acutus* 79: *Lenzites elegans* 80: *Lenzites vespaceus* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
- Plate 17.** 81: *Lignosus rhinocerus* 82: *Microporellus fuliginosus* 83: *Microporellus grandiporus* complex 84: *Microporellus inusitatus* complex 85: *Microporellus inusitatus* var. *parvisporus* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
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- Plate 19.** 91: *Navisporus floccosus* complex 92: *Neofomitella rhodophaea* complex 93: *Neofomitella rhodophaea* complex 94: *Perenniporia decurrata* 95: *Perenniporia ferruginea* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
- Plate 20.** 96: *Perenniporia latissima* 97: *Perenniporia marmorata* 98: *Polyporus arcularius* complex 99: *Polyporus dictyopus* complex 100: *Polyporus dictyopus* complex **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
- Plate 21.** 101: *Polyporus philippinensis* complex 102: *Pycnoporus puniceus* 103: *Pycnoporus sanguineus* 104: *Pyrofomes albomarginatus* 105: *Trametes lactinea* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.
- Plate 22.** 106: *Trametes leonina* 107: *Trametes menziesii* 108: *Trametes meyenii* 109: *Trametes modesta* complex 110: *Vanderbylia latissima* complex **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.

Plate 23. 111: *Antrodiella liebmannii* 112: *Flabellophora licmophora* 113: *Flabellophora obovata* 114: *Flabellophora superposita* 115: *Nigroporus vinosus* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.

Plate 24. 116: *Wrightoporia gillesii* 117: *Wrightoporia trametoides* 118: *Cristelloporia pahangensis* 119: *Roseofavolus eos* 120: cf. *Gloeophyllum* **a:** pileus surface, **b:** pore surface, **c:** cross section. The divisions of a scale are equal to 1mm.

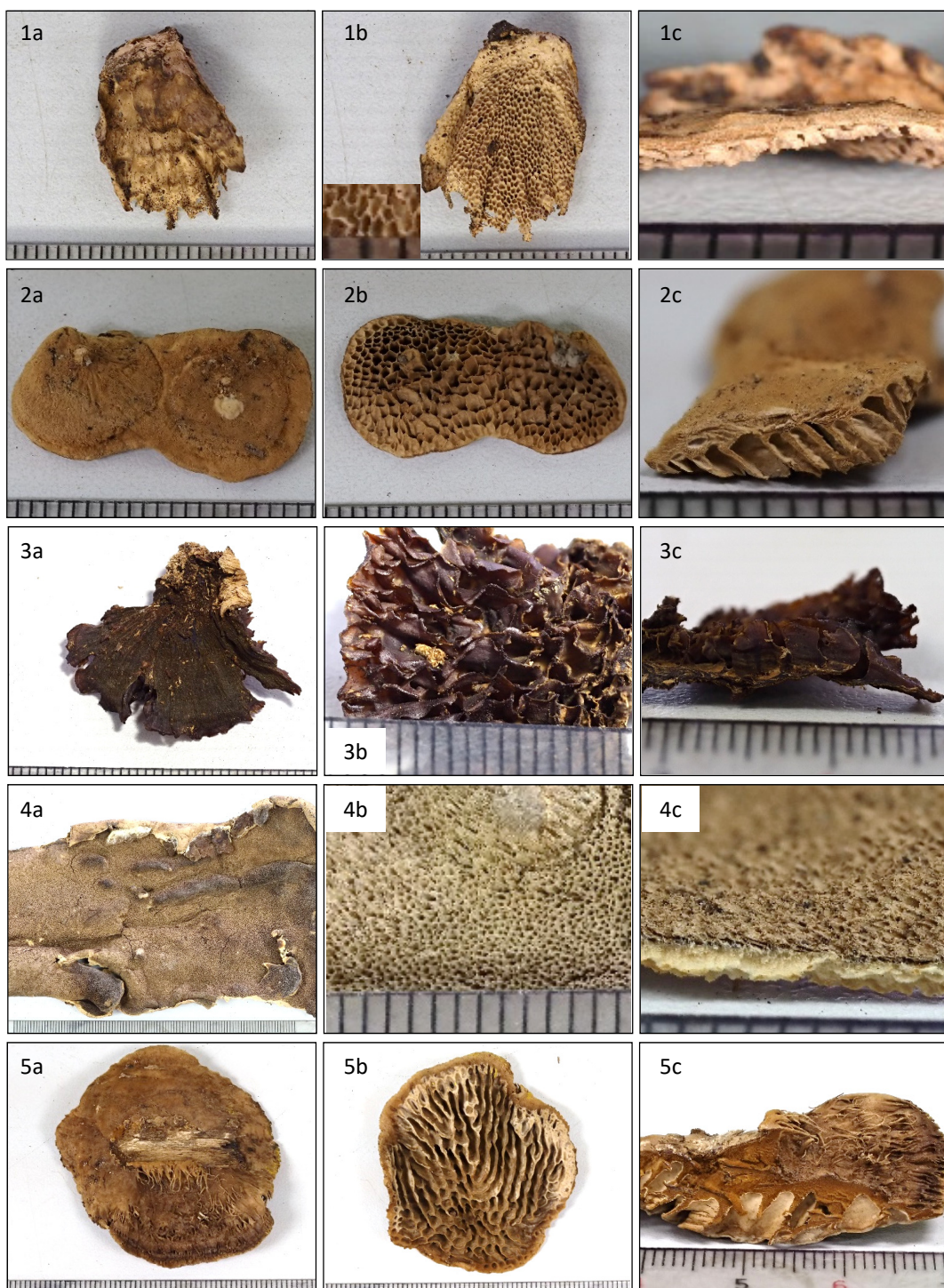


Plate 1 (pic 1-5)



Plate 2 (pic 6-10)

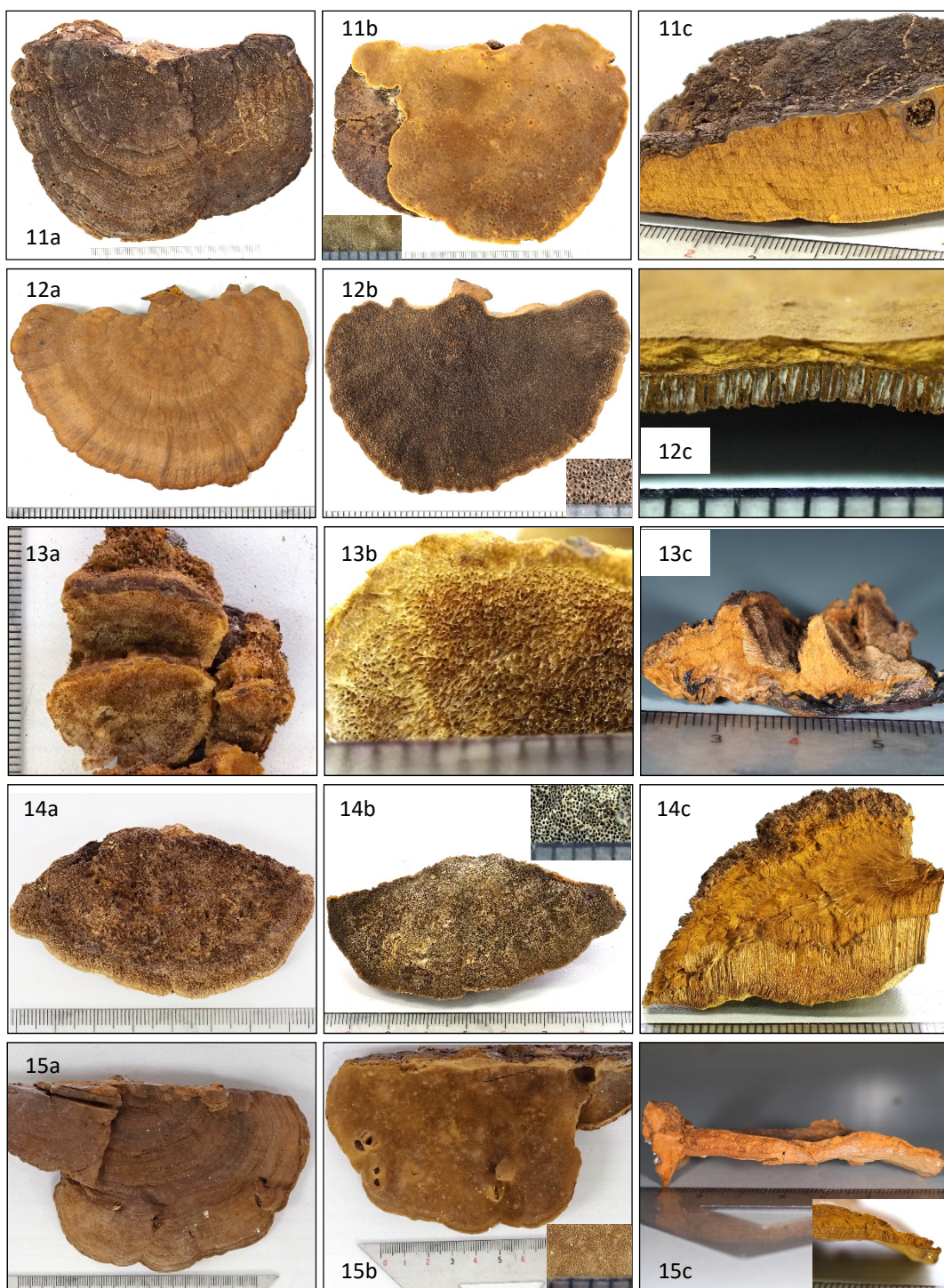


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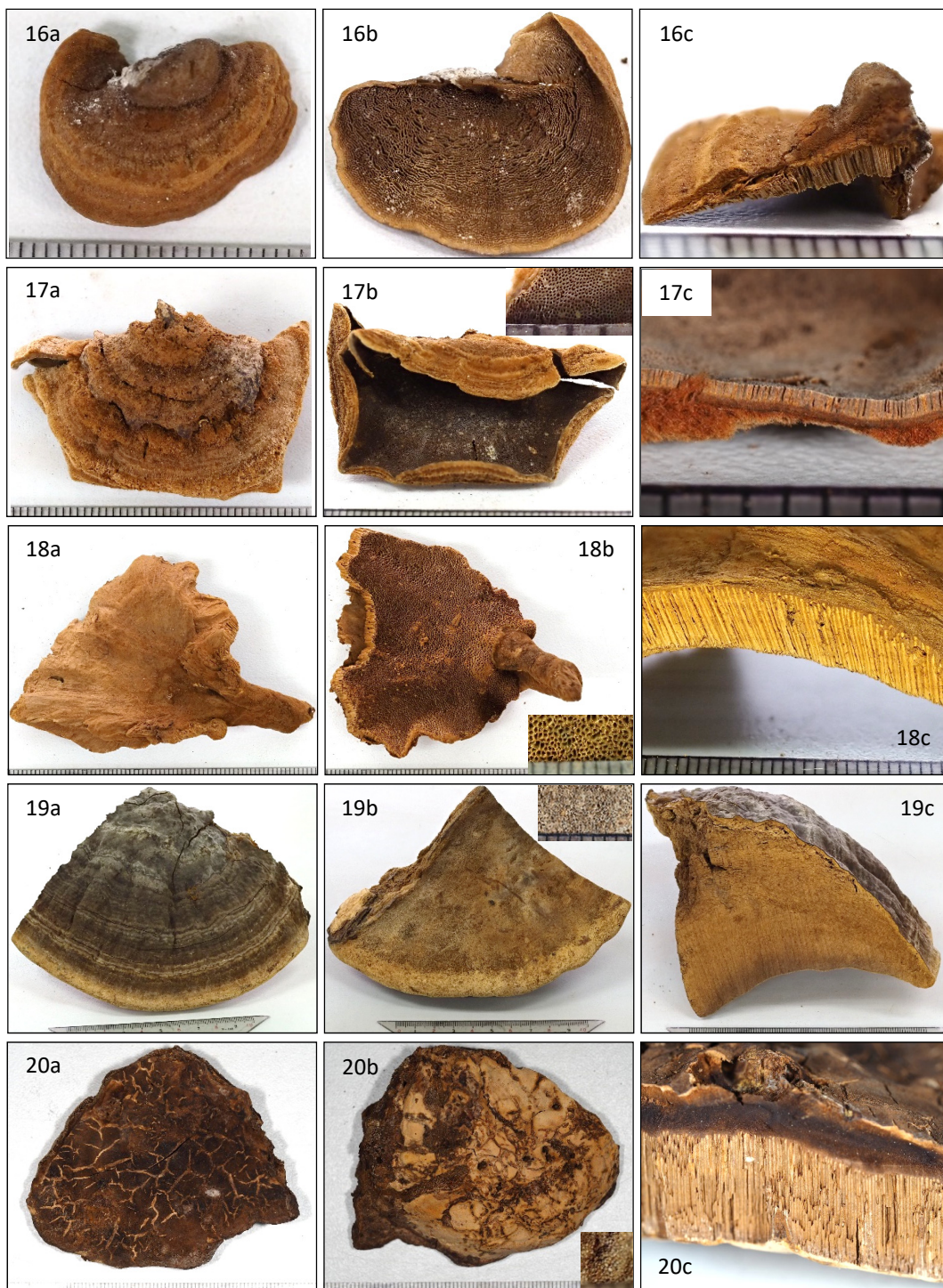


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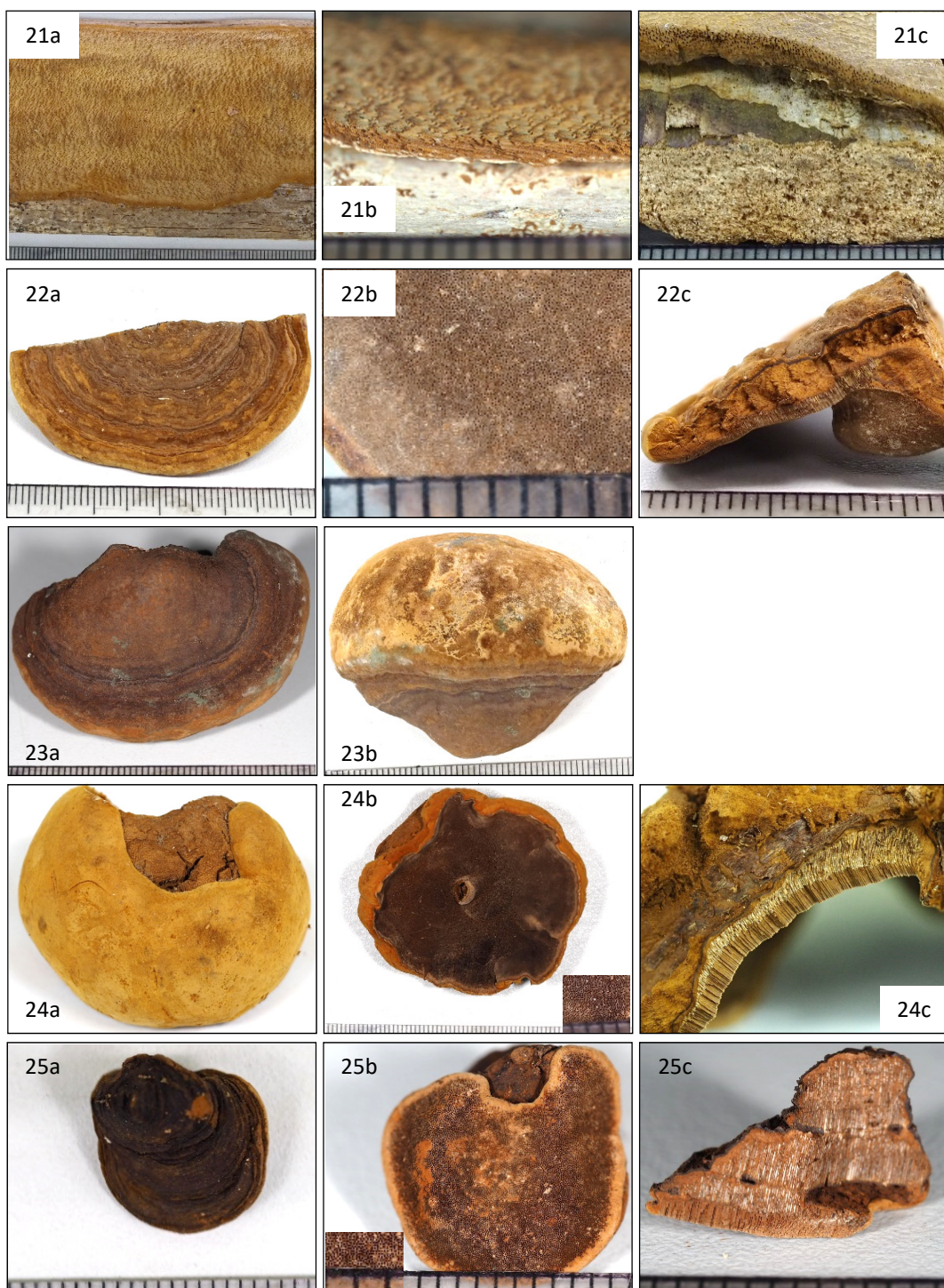


Plate 5 (pic 21-25)



Plate 6 (pic 26-30)

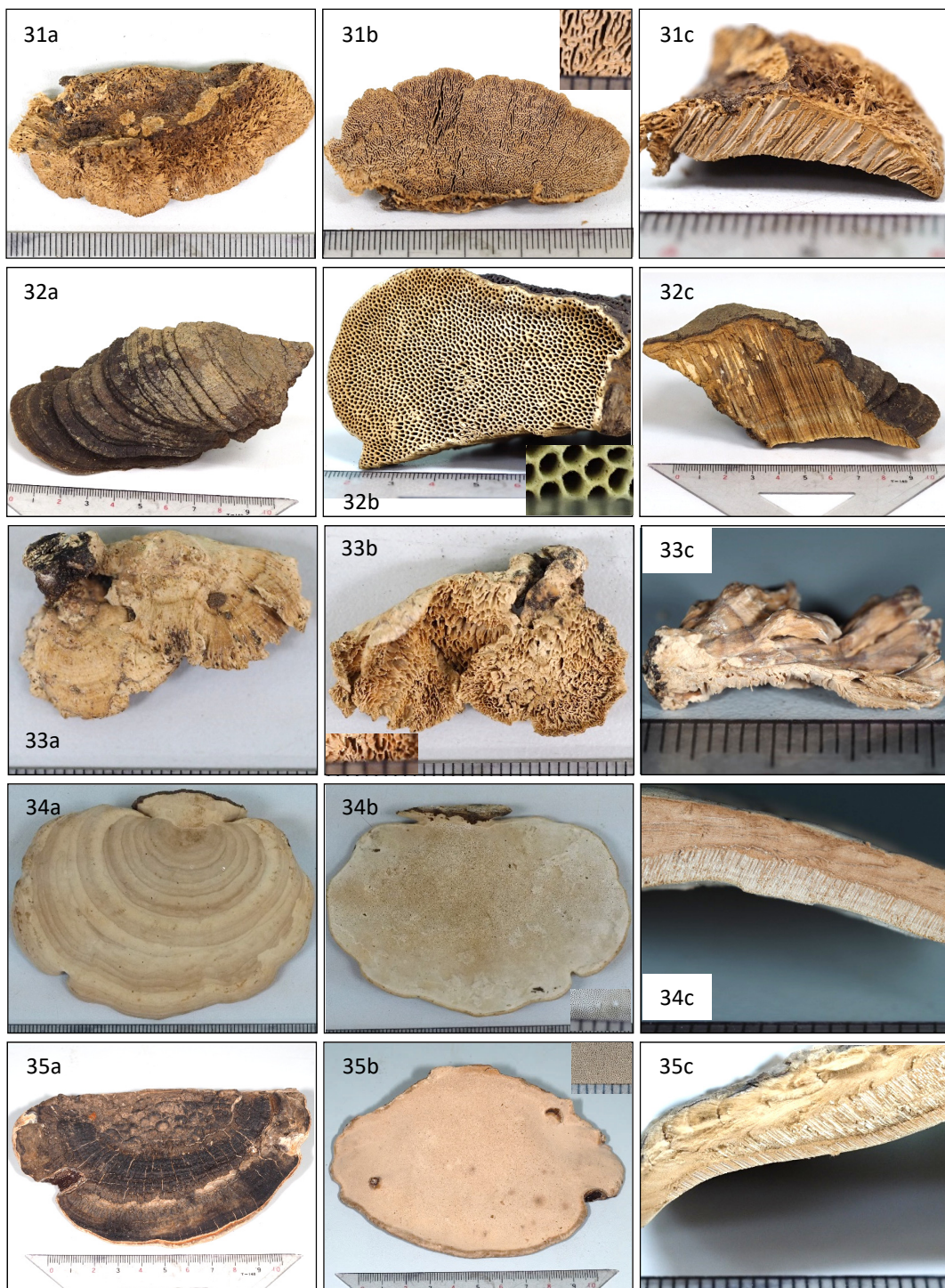


Plate 7 (pic 31–35)

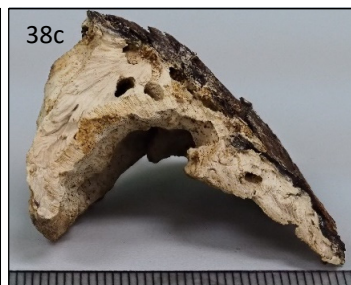
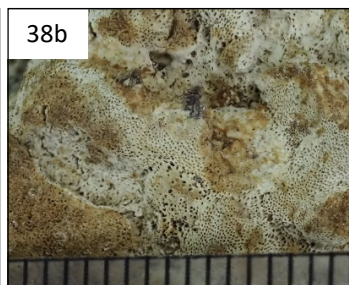
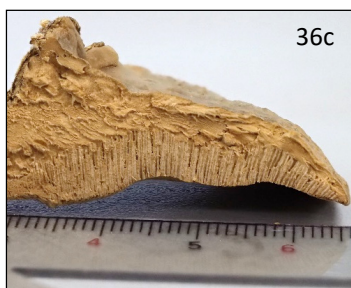


Plate 8 (pic 36-40)

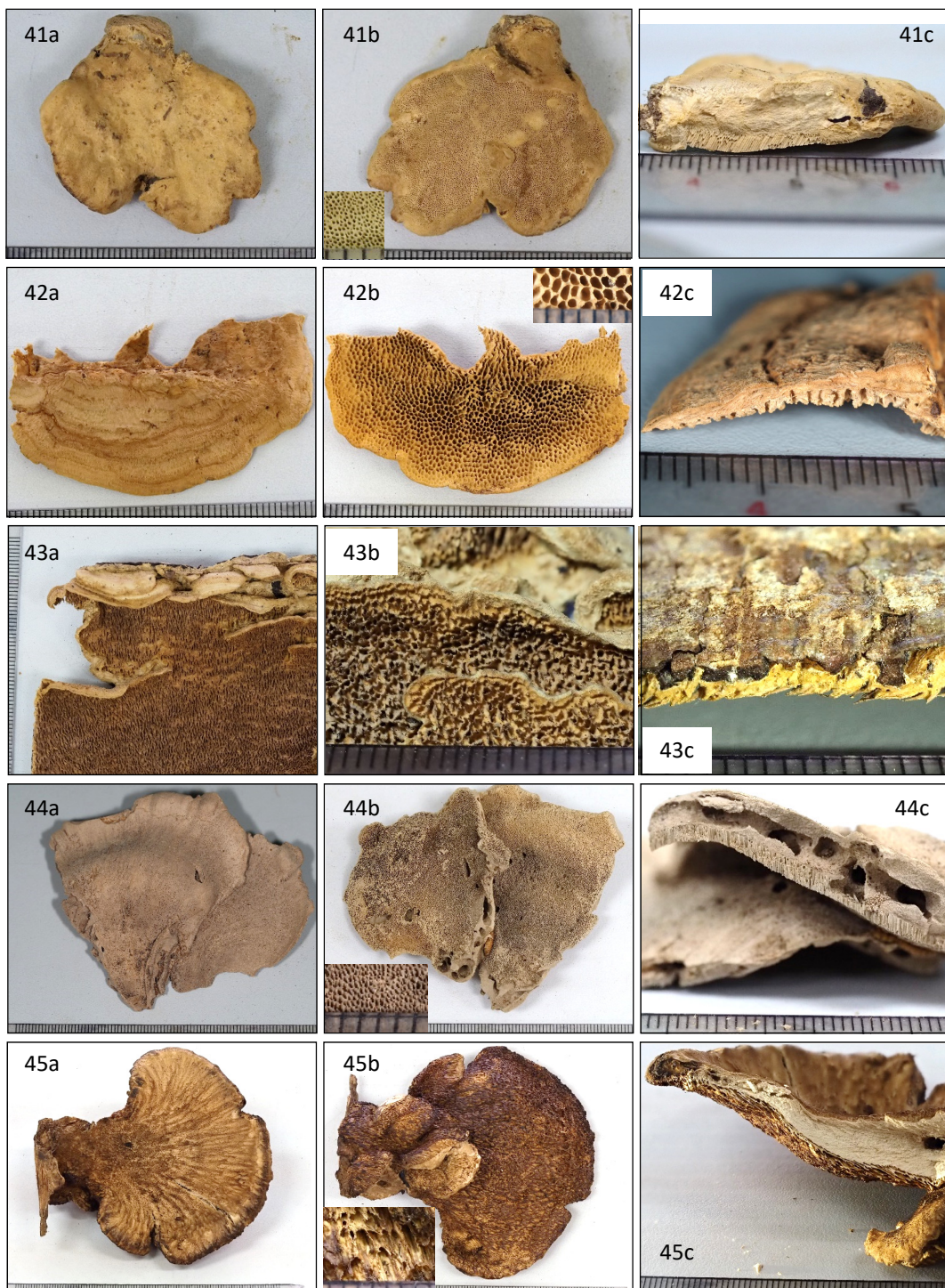


Plate 9 (pic 41-45)



Plate 10 (pic 46-50)



Plate 11 (pic 51-55)



Plate 12 (pic 56–60)

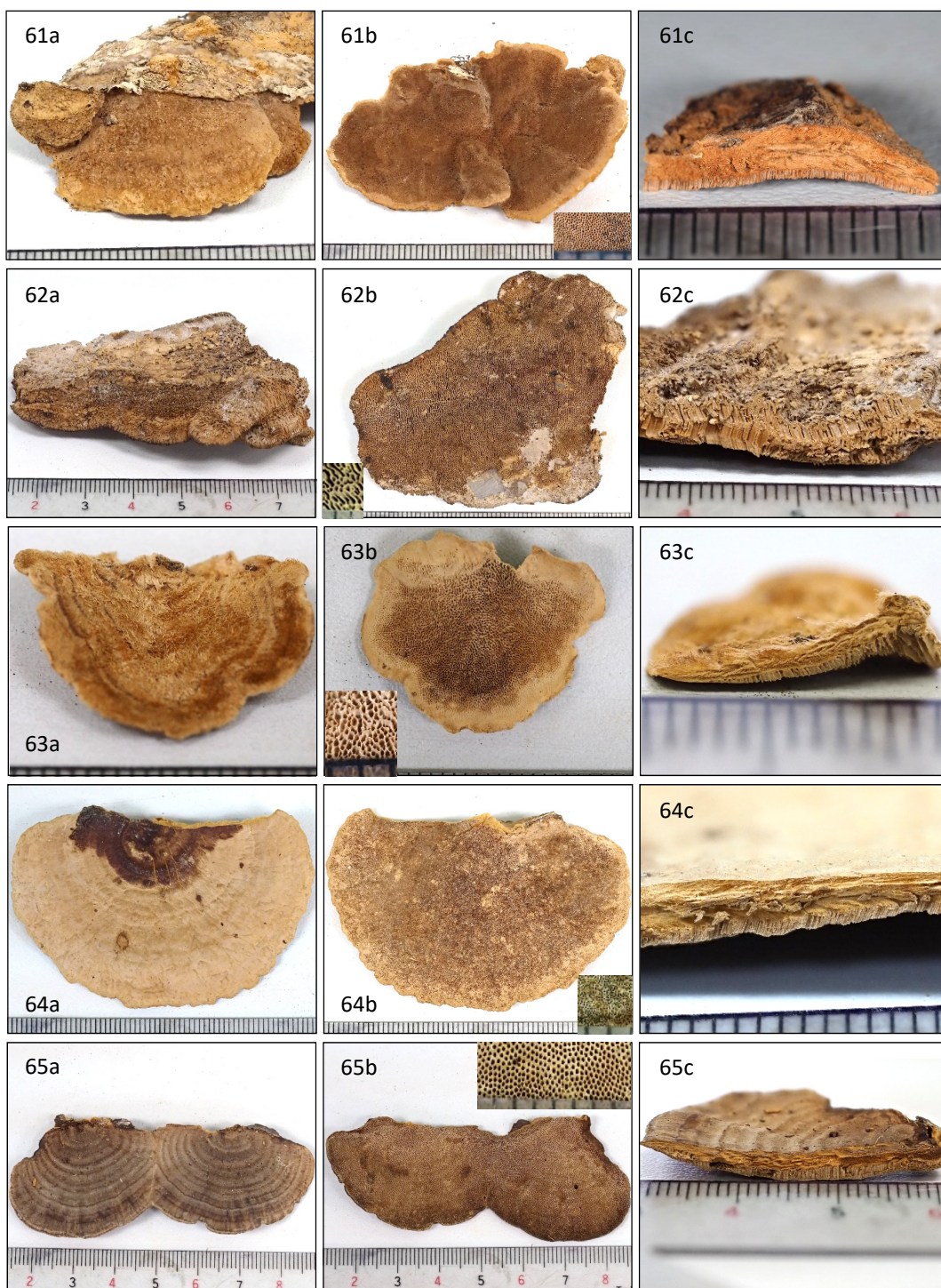


Plate 13 (pic 61-65)

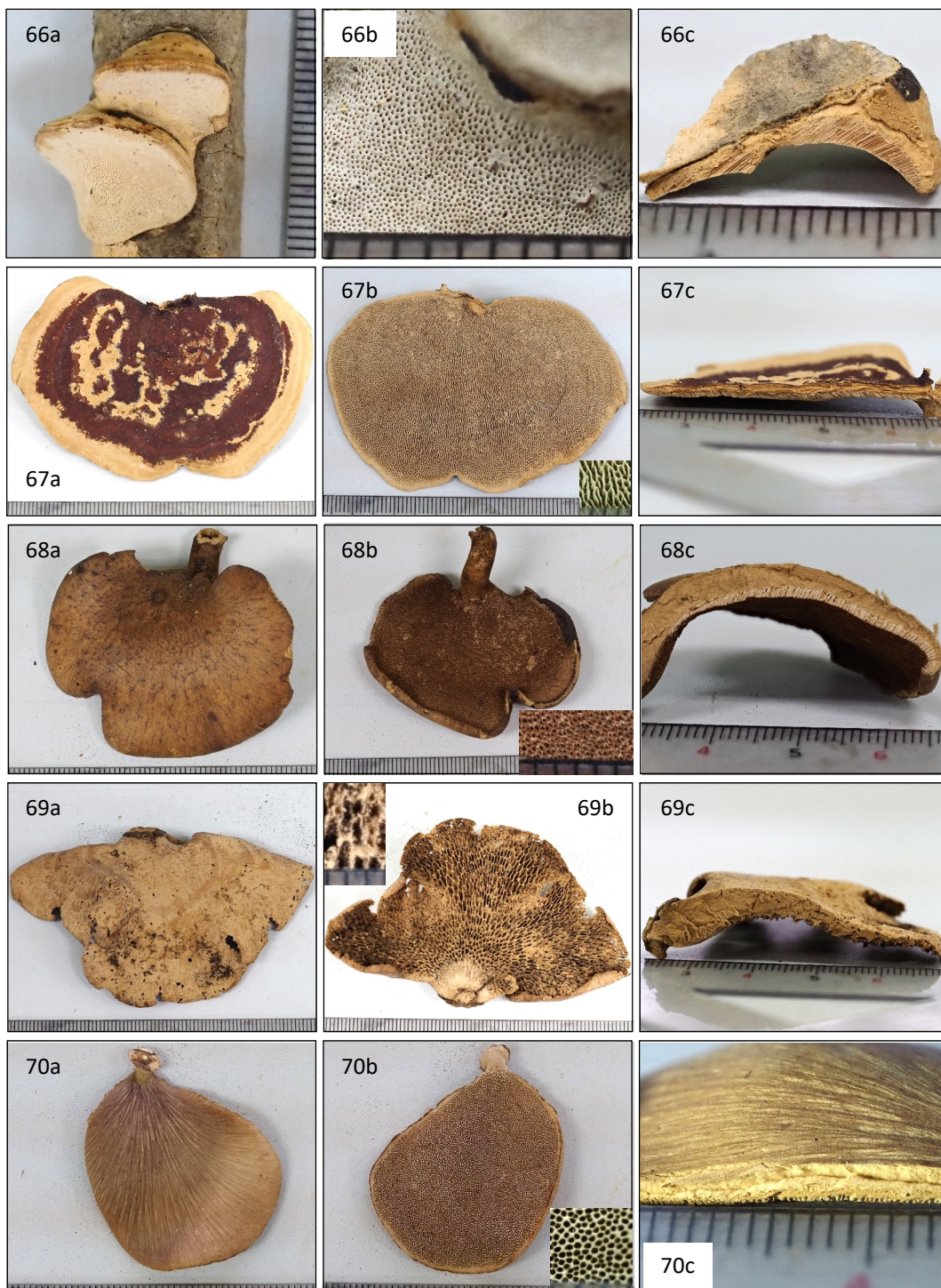


Plate 14 (pic 66-70)

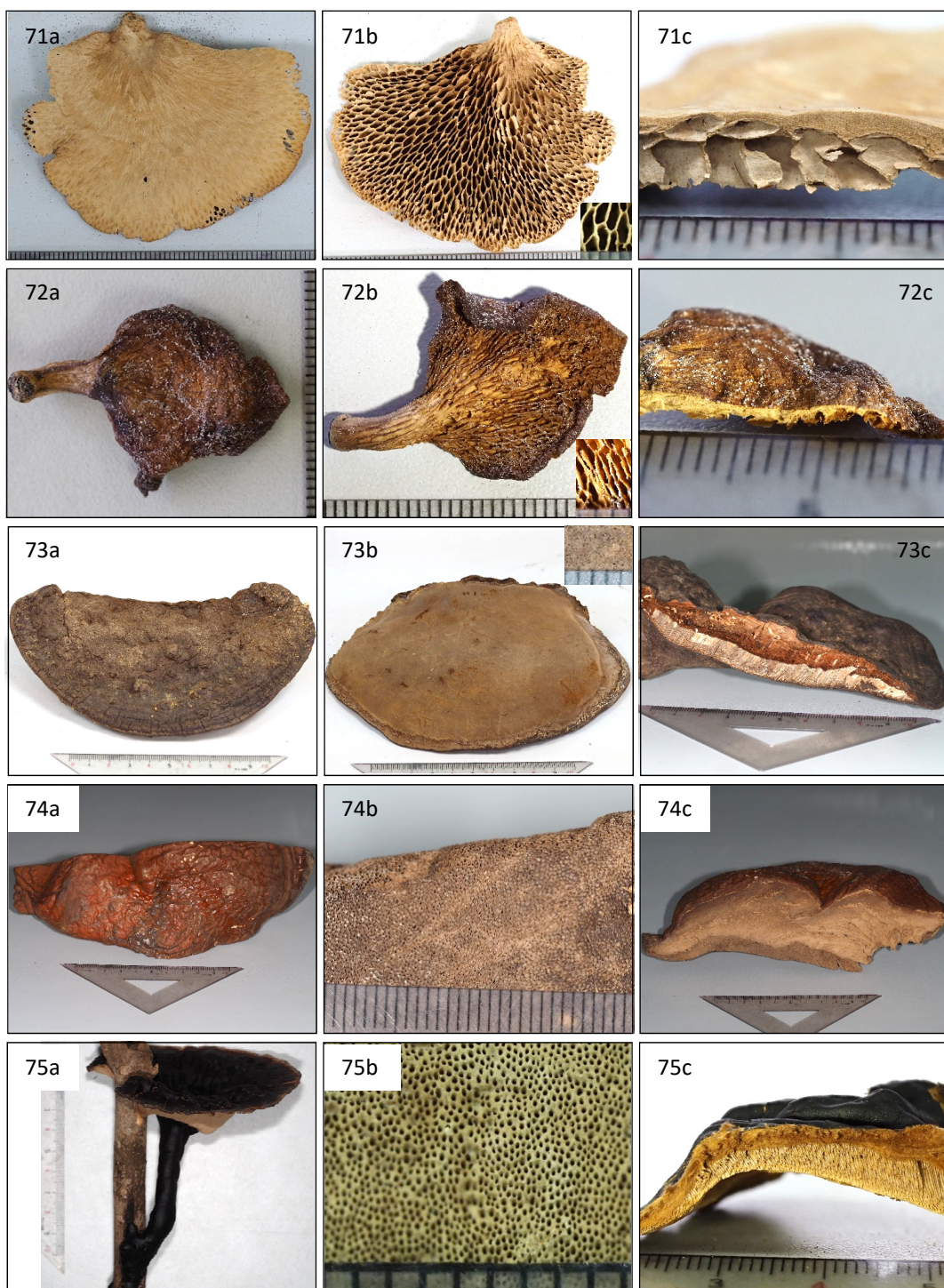


Plate 15 (pic 71-75)



Plate 16 (pic 76-80)

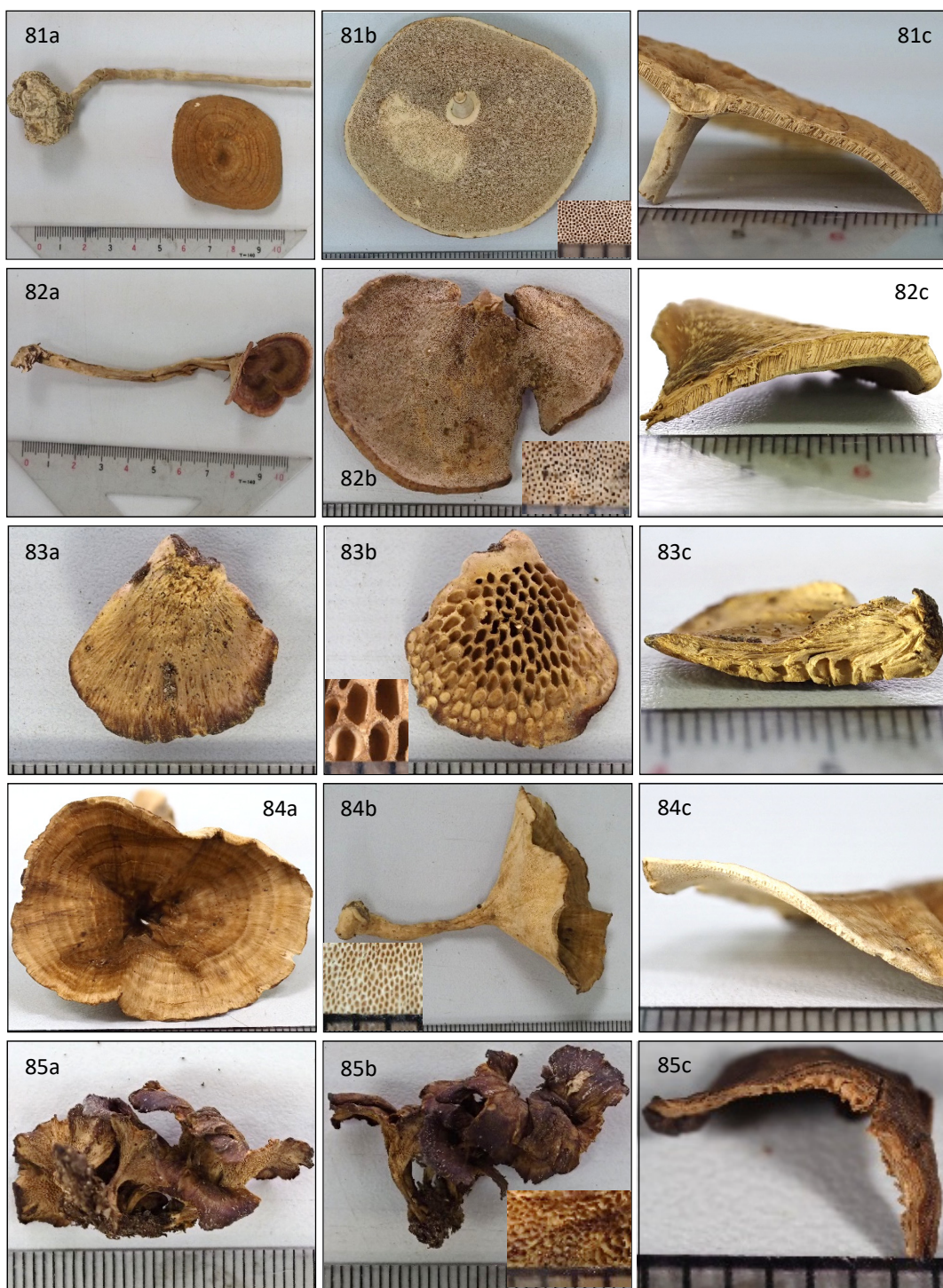


Plate 17 (pic 81-85)



Plate 18 (pic 86-90)

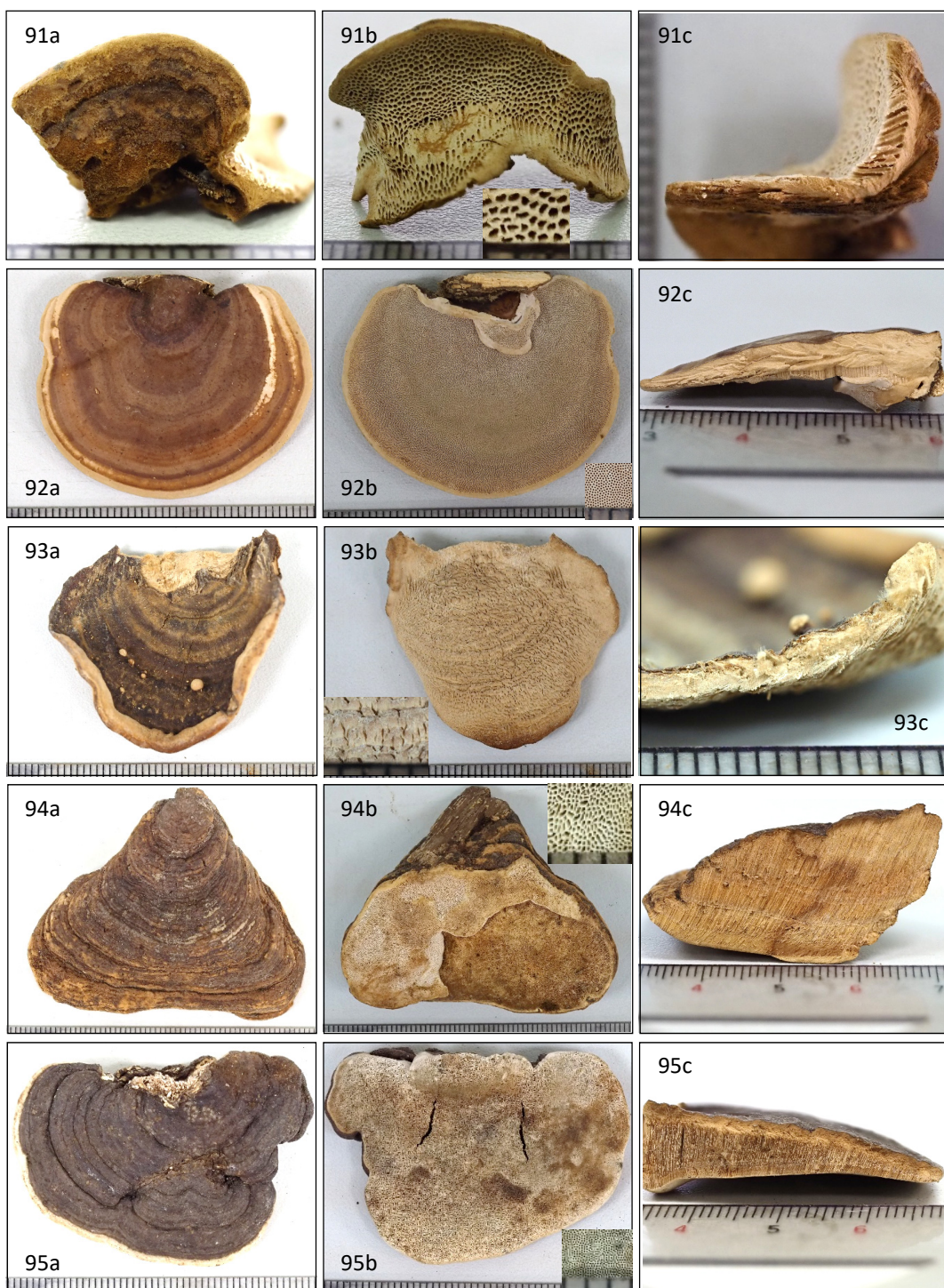


Plate 19 (pic 91-95)



Plate 20 (pic 96-100)



Plate 21 (pic 101-105)

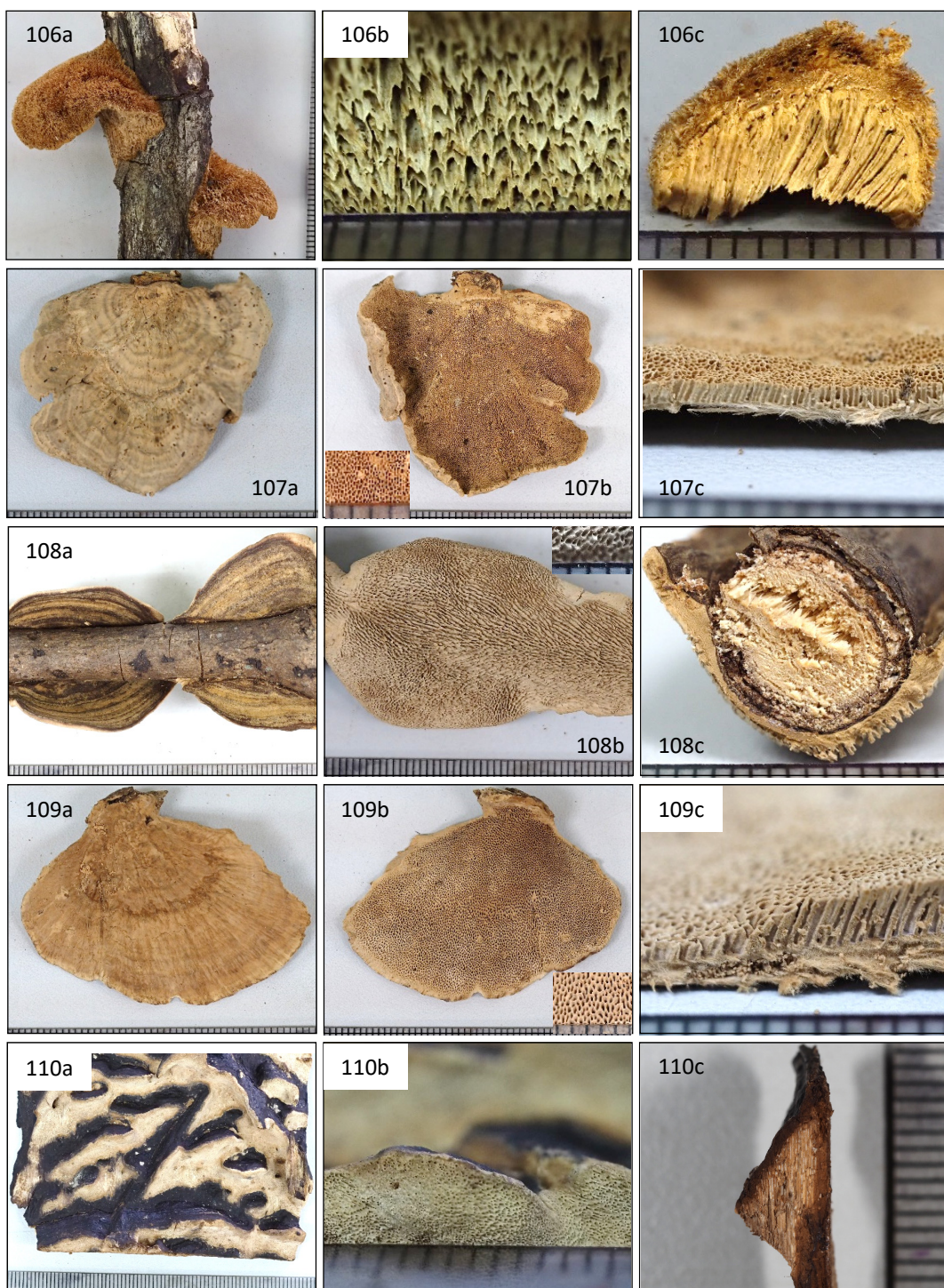


Plate 22 (pic 106-110)



Plate 23 (pic 111-115)

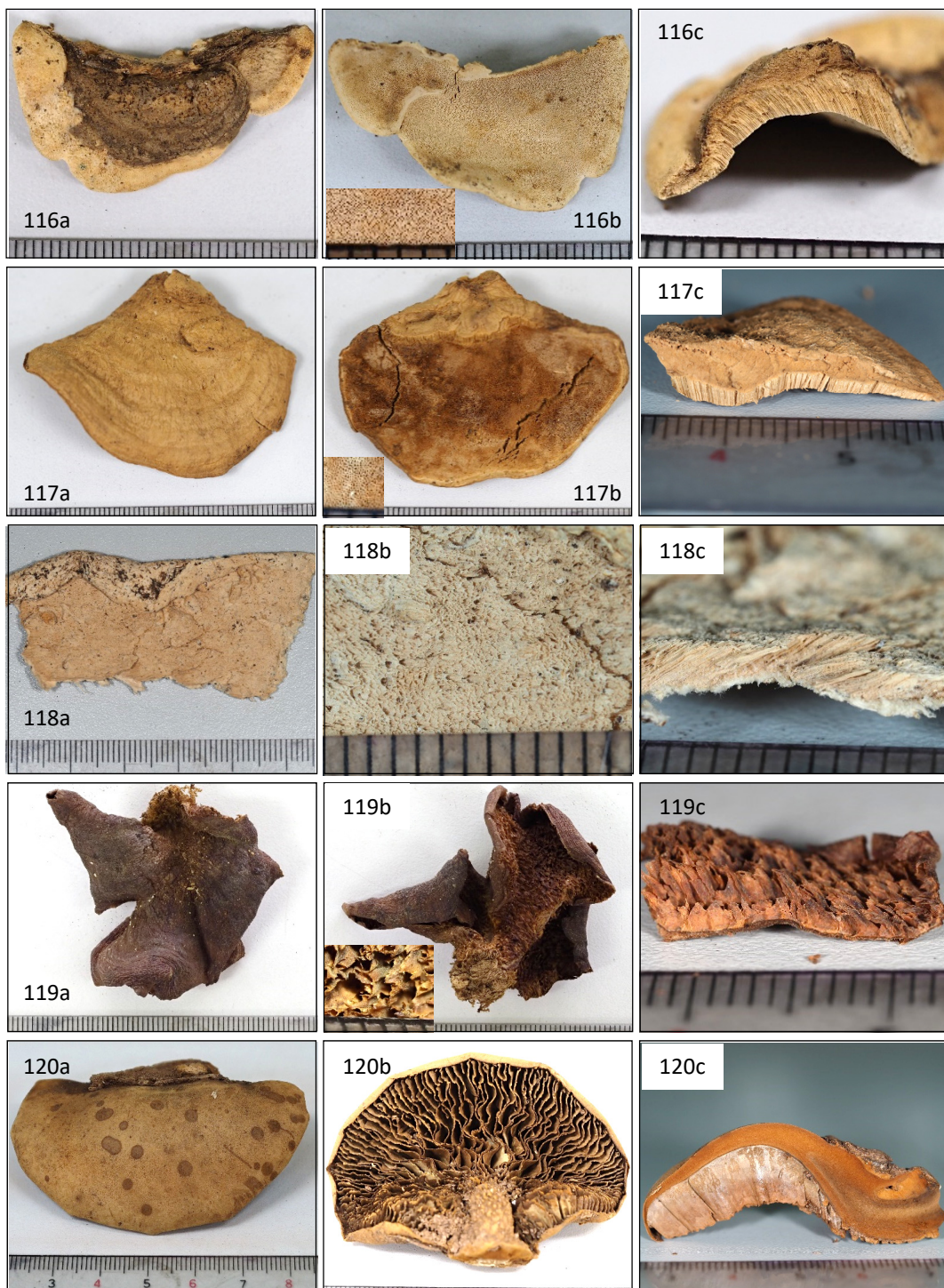


Plate 24 (pic 116-120)

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